

#### 4.0 METHODS

Based on available information, estimates of the magnitude of recreational by-catch in the Galveston Bay system were attempted only for finfish and only for the sport-boat mode of finfish. Estimates were made in the following manner:

1. NMFS MRFSS data for the years that sport-boat fishermen who completed a trip in the Galveston Bay system were interviewed were summed over species by year and mode of fishing (Table 9). Hiatt and Worrall (1977) found marine recreational fishermen could not accurately nor consistently identify marine fish to species. Over 500 species of fish occur in the marine waters of the Gulf of Mexico off the Texas and Louisiana coasts (Hoese and Moore 1977), and even the trained professionals that the NMFS and TPWD employ to survey fishermen sometimes are unable to identify some fish to species (See Table 5 of this paper and Campbell et al. 1991). Data were then summed over years by mode to provide totals for all fish landed, all fish reported as released alive and all fish reported as released dead. Only the boat mode of the NMFS MRFSS data was considered to be consistent with TPWD sport-boat data.
2. A ratio of the number of fish reported released over the number of fish landed and identified by NMFS interviewers was developed. Ratios were developed for fish reported released alive and fish reported released dead as well as for all reported released (Table 10).
3. Estimated annual landings for all species combined for the period 1979-1985 derived from the TPWD monitoring of sport-boat fishermen (Table 3) were multiplied by the by-catch ratios to provide an estimate of recreational finfish by-catch. The specific by-catch ratio is treated as a constant in the calculations (e.g., for each fish seen in interviews by TPWD, 1.85 fish would be assumed caught and discarded according the NMFS data). Therefore, the variances presented for all estimates are those of the TPWD estimates of landings.

No attempts were made to develop by-catch ratios for species or to partition the data into seasons or geographic areas within the Galveston Bay system because of the paucity of data. Similarly, no attempt was made to estimate biomass of finfish because of the lack of data.

Table 9. NMFS MRFSS recreational data summarized over species, by mode and year and combined over years by mode.

Mode	Year	Landed	Released Alive	Released Dead	Other <sup>1</sup>
Sport- Boat	1979	1,519	2,418	92	508
	1980	1,295	1,780	66	300
	1981	184	835	2	192
	1985	194	580	139	9
Charter	1980	42	16	--	2
Shore	1979	482	1,003	129	450
	1980	145	397	15	77
	1981	126	190	--	65
	1982	25	6	--	--
	1983	7	13	1	--
	1984	430	164	38	38
	1985	183	372	57	31
Combined Over Years					
Sport-Boat		3,192	5,613	299	1,009
Charter		42	16	--	2
Shore		1,398	2,145	240	661

1. **Other** Consists of fishes reported as used for bait, filleted, given away, sold or otherwise not available for inspection by interviewer.

Table 10. Calculation of sport-boat by-catch factors using NMFS MRFSS data (1979-1985). Factors are summed over species by year for sport-boat fishermen interviews.

Year	Total Fish landed	Total By-catch	Total Released Alive	Total Released Dead	Factors <sup>1</sup>		
					Total Bycatch	Total Alive	Total Dead
1979	1519	2510	2418	92	1.65	1.59	0.06
1980	1295	1846	1780	66	1.42	1.37	0.05
1981	184	837	835	2	4.54	4.54	0.01
1985	194	719	580	139	3.71	2.99	0.72
Combined	3192	5912	5613	299	1.85	1.75	0.09

1. Factors

Total bycatch = Total bycatch ÷ total landed

Total alive = Total alive ÷ total landed

Total dead = Total dead ÷ total landed